The present invention, as recited in claim 1, relates to a hydrodynamic bearing having a radial bearing portion and a thrust bearing portion with each including two members that face one another. One of the members forming the radial bearing portion has a surface with a groove or grooves that generate a force in a thrust direction. This force brings the two members of thrust bearing portion closer to each other. Also, one of the surfaces of the members forming the thrust bearing portion has a groove or grooves that generate hydrodynamic pressure in the thrust direction. The force generated in the thrust direction by the radial bearing portion reduces the gap between the two members forming the thrust bearing portion, and this force is balanced by the hydrodynamic pressure generated in the thrust bearing portion. This balancing condition creates enhanced thrust rigidity, which in turn reduces variation in thrust position (page 7, lines 1-12 of Applicants' disclosure). To generate the thrust force for making the gap between the two members in the thrust bearing portion narrower, the grooves formed in the radial bearing portion are inclined. The inclination of the grooves with respect to the axis of the bearing is in a direction in which the force may be generated by means of a screw effect when a rotational member is rotated (page 11, line 8 through page 12, line 2).

Applicants respectfully submit that the Examiner has failed to establish a prima facie basis for lack of novelty under 35 U.S.C. § 102.[1] Specifically, Kloeppel fails to disclose the

[1] The factual determination of lack of novelty under 35 U.S.C. § 102 requires the identical disclosure in a single reference of each element of a claimed invention, such that one having ordinary skill in the art would have recognized that the identically claimed invention is within the public domain. **ATD Corporation v. Lydall, Inc.**, 159 F.3d 534, 48 USPQ2d 1321 (Fed. Cir. 1998); **Electro Medical Systems S.A. v. Cooper Life Sciences, Inc.**, 34 F.3d 1048, 32 USPQ2d 1017 (Fed. Cir. 1994). Furthermore, the Examiner must also establish that the applied reference identically discloses *each* feature of the claimed invention. **In re Rijckaert**, 9 F.3d 1531, 28 USPQ2d 1955 (Fed. Cir. 1993); **Lindermann Maschinenfabrik GMBH v. American Hoist & Derrick Co.**, 730 F.2d 1452, 221 USPQ 481 (Fed. Cir. 1984). As part of this analysis, the Examiner must (a) identify the elements of the claims, (b) determine the meaning of the elements in light of the specification and prosecution history, and (c) identify

claimed groove or grooves in the radial bearing portion that generate a force in a thrust direction, which forces closer the members facing one another in the thrust bearing portion.

Kloeppel discloses a hydrodynamic bearing wherein a shaft is rotated for the purpose of reducing weight of rotating elements and minimizing power consumption (column 3, lines 39-43). In such a hydrodynamic bearing, the shaft 80 and thrust plate 81 are supported for rotation by fluid (gas or liquid) between the surfaces of the two and the corresponding inner surfaces of the sleeve 82 and the counter-plate 84, wherein these surfaces have patterns of grooves thereon (column 5, lines 17-24). However, it is not apparent that grooves are formed on an outer circumference of the shaft 80 or an inner circumference of the sleeve 81. Notwithstanding the ambiguity as to what surfaces in the phrase "these surfaces have patterns of grooves thereon" are being referred to in column 5, line 21, Kloeppel fails to teach or suggest that the groove or grooves in the radial bearing portion generate a force in a thrust direction, which forces the members of the thrust bearing portion closer to one another, as recited in claim 1.

The above argued differences between the hydrodynamic bearing defined in independent claim 1 and the device of Kloeppel undermine the factual determination that Kloeppel identically describes the claimed invention within the meaning of 35 U.S.C. § 102. **Minnesota Mining & Manufacturing Co. v. Johnson & Johnson Orthopaedics Inc.**, 976 F.2d 1559, 24 USPQ2d 1321 (Fed. Cir. 1992); **Kloster Speedsteel AB v. Crucible Inc.**, 793 F.2d 1565, 230 USPQ 81 (Fed. Cir. 1986). Applicants, therefore, respectfully submit that the imposed rejection of claim 1-3 and 5-6

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corresponding elements disclosed in the allegedly anticipating reference. **Lindermann Maschinenfabrik GMBH v. American Hoist & Derrick Co.**, supra.

under 35 U.S.C. § 102 for lack of novelty as evidenced by Kloeppel is not factually viable and, hence, solicit withdrawal thereof.

Claim 4 is rejected under 35 U.S.C. § 103 for obviousness predicated upon Kloeppel in view of Ichiyama

On pages three and four of the Office Action, the Examiner concluded that one having ordinary skill in the art would have been motivated to modify the hydrodynamic bearing of Kloeppel in view of Ichiyama to arrive at the claimed invention. This rejection is respectfully traversed.

Ichiyama discloses a hydrodynamic bearing having herring-bone grooves 13 in the upper side of the radial bearing portion, as well as spiral grooves 14 in a lower side (Fig. 2a). The spiral grooves 14 are formed for the purpose of drawing the fluid downwardly during rotation of the shaft 2 to increase hydrodynamic pressure in the thrust bearing portion 19 together with the pressure generated by the spiral grooves 15 formed in the thrust bearing portion 19. This increased hydrodynamic pressure is balanced with an urging force due to a magnetic bias shown by an arrow A in Fig. 1 (column 8, lines 19-24). Because of this magnetic urging force, a thrust bearing portion for supporting a shaft 2 upwardly during rotation is not provided in the bearing of Ichiyama (column 8, lines 53-58; Figs. 1-4).

When the spiral grooves 14, as shown in Fig. 2a of the Ichiyama, are provided on inner surface of the sleeve 4, the shaft 2 to be inserted in the sleeve 4 (see Fig. 1) should be rotated

counter-clockwise when viewed from an upper side of the drawing. Fluid 6 existing in the radial bearing portion is drawn downwardly toward the thrust bearing portion 19 by this counter-clockwise rotation. This fluid may be used for increasing hydrodynamic pressure in the thrust bearing portion. During rotation, the shaft 2 is also urged downwardly because of a screw effect of the spiral grooves 14. However, even though the shaft 2 is urged downwardly, the gap between the members forming the thrust bearing portion is not reduced, in contrast to that of the present invention, because the spiral grooves are not formed at an underside of the thrust plate 3 (line 53-58 in column 8) in this hydrodynamic bearing. Since the grooves 15 are formed on the upper side of the thrust plate 3 of Ichiyama, the downward movement of the shaft 2 increases the gap in the thrust bearing portion of this bearing, which is in a completely opposite direction to that of the present invention.

Whereas Ichiyama guides fluid in the radial bearing portion toward the thrust bearing portion by means of the spiral grooves 14, the present invention intends to enhance thrust rigidity by reducing the gap in the thrust bearing portion by means of screw effect created by the spiral grooves formed in the radial bearing portion. Fig. 4 of Applicants' disclosure shows a hydrodynamic bearing in which the shaft rotates. The shaft 2 is provided with spiral grooves 7 inclined in a left handed direction. When the shaft 2 rotates in the counterclockwise direction, the shaft 2 is urged downwardly in the drawing by the screw effect of the spiral grooves 7, which in turn reduces the gap in the thrust bearing portion, whereby enhanced thrust rigidity is achieved. In this particular condition, fluid located in the radial bearing portion in drawn upwardly (away from the thrust bearing portion) by the effect of the spiral grooves 7, which is in a completely opposite direction to that intended by Ichiyama (in which the fluid needs to guided

toward thrust bearing portion downwardly located). Thus, the present invention differs from Ichiyama in terms of both operation and working effect.

Based on the above, it is clear that techniques disclosed in Ichiyama and the present invention are completely different notwithstanding that Ichiyama shows forming spiral grooves in a radial bearing portion. As defined by claim 1, the present invention recites that:

a) either one of the surfaces forming said redial bearing portion is provided with a groove or grooves which generate a force in a thrust direction so as to make the two facing members at said thrust bearing portion closer to each other, and

b) either one of the surfaces of said two facing members at said thrust bearing portion is provided with a groove or grooves which generate hydrodynamic pressure in said thrust direction,

thereby balancing these two element and enhancing the rigidity of the thrust bearing portion.

However, Ichiyama does not disclose or suggest these unique features of the present invention, which is to enhance rigidity of the thrust bearing portion by reducing the gap between the facing members in the thrust bearing portion. Fig 5 of the Ichiyama shows a hydrodynamic bearing having grooves 60 in the radial bearing portion as well as grooves 60 on both side of the thrust plate 56. In this example, however, the grooves 60 formed in the radial bearing portion are herring-bone grooves (column 2, line 13), which are used for generating radial hydrodynamic pressure only, and are not designed to generate an urging force for narrowing the gap in the thrust bearing portion. Thus, even if one having ordinary skill were motivated to modify Kloeppel

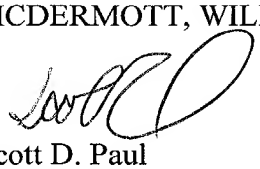
in view of Ichiyama, the claimed invention would not result. Applicants, therefore, respectfully submits that the imposed rejection of claim 4 under 35 U.S.C. § 103 for obviousness predicated upon Kloeppel in view of Ichiyama is not viable and, hence, solicits withdrawal thereof.

Applicants have made every effort to present claims which distinguish over the prior art, and it is believed that all claims are in condition for allowance. However, Applicants invite the Examiner to call the undersigned if it is believed that a telephonic interview would expedite the prosecution of the application to an allowance. Accordingly, and in view of the foregoing remarks, Applicants hereby respectfully request reconsideration and prompt allowance of the pending claims.

To the extent necessary, a petition for an extension of time under 37 C.F.R. § 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417, and please credit any excess fees to such deposit account.

Respectfully submitted,

MCDERMOTT, WILL & EMERY



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